EMERGENCY DISEASE PROGRAM FACTSHEET

Animal Health and Food Safety Services
Animal Health Branch

Viral Encephalitides in Horses and Ratites
June 2000

Introduction
There are several important, viral infections affecting horses and ratites that may be transmitted by infected insect vectors.

- Western Equine Encephalitis (WEE)
- Eastern Equine Encephalitis (EEE)
- Venezuelan Equine Encephalitis (VEE)
- West Nile Virus (WNV)

Encephalitides in horses
These viruses affect the central nervous system of horses causing similar clinical signs that vary greatly from inapparent to lethal infections. Clinical signs in horses include:

- Depression and listlessness
- Stumbling and incoordination
- Weakness of limbs
- Convulsions
- Circling
- Hyperexcitability
- Partial paralysis
- Coma

These signs may progress to death. Fever may or may not be present.

Transmission
The causative viruses are spread by mosquitoes and in addition to horses may infect a variety of vertebrate hosts including people. Birds are the significant reservoir for the viruses, and may develop very high blood levels. Birds may harbor the infection without showing clinical signs.

Horses infected with WEE are not considered reservoirs but are "dead-end hosts" of the virus. A "dead-end host" is unable to transmit the infection to insect vectors for further transmission to susceptible birds or animals. Horses with VEE and EEE occasionally may amplify the virus to high enough levels in their blood to infect biting mosquitoes, thus serving as a reservoir. It has not yet been determined whether the horse is strictly a "dead-end host" for WNV. This is currently being evaluated.

In general, the development of equine and human epidemics associated with these viruses requires widespread infection of mosquitoes and birds and adjacent populations of susceptible horses and people.

Disease Distribution
As the name implies, WEE is occasionally diagnosed in the western United States, but in very low numbers. In California, WEE was last reported in four horses during 1997 and two people during 1986.

VEE is typically observed in South and Central America and Mexico. The last major outbreak of VEE in the US was in 1971, and California conducted a massive vaccination campaign in horses.

EEE has been observed historically only east of the Mississippi River and rarely in Texas. There has been a recent equine death in southern California attributed to EEE virus. The source of the infection has not been identified and is under investigation. The risk of other horses or people becoming infected as a result of this single horse is very low.

WNV has previously been found in Africa, western Asia, the Middle East, and the Mediterranean region of Europe. WNV was first recognized in the Northeastern United States during October, 1999.

The only known equine deaths occurred in New York. Additionally, there were six human deaths attributed to the virus, and a significant number of deaths occurred in the wild birds, particularly crows. Birds are not only affected clinically, but serve as the major reservoir for the virus. The virus has successfully overwintered on the Eastcoast, although it is unknown whether another outbreak will occur in 2000. In addition to monitoring for EEE, WEE, and VEE in vector, bird, horse, and human populations, the Centers for Disease Control and state and local public health departments will be monitoring for WNV.

Diagnosis and Treatment
Diagnosis includes testing blood samples for antibodies against the disease and virus isolation. Brain samples should be submitted from fatal cases. The California Department of Food and Agriculture (CDFA) and the California State Department of Health Services (DHS) work collaboratively to increase public, physician, and veterinarian awareness. A detailed reporting system for suspected cases is in place and includes assistance from local county health departments, DHS laboratories, CDFA Animal Health District Offices, and the California Animal Health and Food Safety Services (CAHFS) laboratory system.

Control and Prevention
California DHS has a comprehensive year-round mosquito control program that actively controls mosquitoes in flood control channels, streams, creeks, and other water sources on public grounds. Chickens, acting as highly susceptible sentinel birds, are strategically placed throughout the state, and blood samples are monitored on a regular basis for exposure to arboviruses through infected mosquitoes. Additionally, mosquitoes are routinely trapped and analyzed for the presence of virus. When infected mosquito activity is detected, substantial emphasis is placed on mosquito control, as well as public information regarding preventative action.

Prevention includes reducing or eliminating exposure to mosquitoes. Horses should be stabled inside during peak mosquito feeding times (dusk and dawn) and treated with insect repellants if mosquito activity is high. Vaccines are available to protect against WEE, EEE, and VEE and should be administered as recommended by a veterinarian in May or June of each year. A vaccine for WNV vaccine is currently unavailable.

Zoonotic Potential
Zoonotic diseases may be transmitted from infected animals to people. Mosquito-borne encephalitides may be transmitted to people by mosquitoes that have fed on infected birds or, rarely, mammals. These infections have been virtually absent from the human population in California over the last several decades, although in 1952 a significant outbreak of WEE occurred in people living in central California. When people are affected, they develop headache, high fever, chills, nausea, and vomiting that may progress to coma and seizures. Although risk of exposure to these diseases in California is very small, people can take a number of precautions to diminish mosquitoes in their area and avoid bites:

- Drain all standing water on private property and stock permanent ponds with fish that eat mosquito larvae.
- Avoid outside activity when mosquitoes are most active (dawn and dusk).
- Wear protective clothing (long pants and long sleeves) and apply insect repellant to exposed areas.
- Keep infants indoors during peak mosquito hours or if outside, cover playpens or bassinets with netting.

Where can I get more information?
Another CDFA Factsheet may be helpful:

- *Surveillance and Reporting of Arboviral Encephalomyelitides in Horses and Ratites in California*

For more information, call:

CDFA, Animal Health Branch

Headquarters	(916) 654-1447
Redding District	(530) 225-2140
Modesto District	(209) 491-9350
Fresno District	(559) 237-1843
Ontario District	(909) 947-4462

Or **DHS, Veterinary Public Health Section** (916) 327-0332.

Or the **USDA Area Office** (916) 857-6170 or *toll free* (877) 741-3690.